RAINBOW HYDROELECTRIC FACILITY, STONE CULVERT
On Swimming Pool Road, about 600 feet west-northwest of Powerhouse
Great Falls vicinity
Cascade County
Montana

HAER MT-95-L
HAER MT-95-L

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
INTERMOUNTAIN REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
12795 West Alameda Parkway
Denver, CO 80228

HISTORIC AMERICAN ENGINEERING RECORD

RAINBOW HYDROELECTRIC FACILITY,
STONE CULVERT

I. INTRODUCTION HAER No. MT-95-L

Location:	The stone culvert is on the swimming pool road at the Rainbow Hydroelectric Facility. It lies about 600 feet west-southwest of the Rainbow Powerhouse's southwest corner.
Quad:	Great Falls Northeast, MT (1991)
UTM:	Zone 12; 485116 Easting; 5264945 Northing (NAD 83)
Date of Construction:	ca. 1925
Present Owner:	Pennsylvania Power and Light-Montana (PPL-Montana) 45 Basin Creek Rd., Butte, Montana
Present Use:	Culvert
Significance:	The Rainbow Hydroelectric Facility is one of several discontinuous units comprising the Great Falls Hydroelectric Facilities Historic District. The stone culvert contributes to the significance of the district for its association with the late nineteenth/early twentieth century practice by utility companies to construct and maintain residential camps for operators and their families at isolated hydroelectric plants. Additionally, it is a well-preserved example of the use of stone masonry in culvert construction during the early to mid-twentieth century.
Historian:	Renewable Technologies, Inc. 8 W. Park, Suite 313 Butte, Montana 59701 September 2009

II. HISTORICAL AND DESCRIPTIVE DATA

The stone culvert is on the "swimming pool" road, a dirt road which skirts a natural basin or swale just above (northwest of) the northeast end of the bench where houses in the Rainbow Operators' Camp once stood (Figure 1). The mouth or southeast side of the basin is closed by a fill section for a pair of buried high pressure pipelines, the flowline for the water delivery system serving the plant's original six turbine-generator units. The enclosed basin formerly was the site of a 20' by 54' concrete swimming pool.[1]

The swimming pool road begins at the south corner of the basin where it branches off a two-track concrete tread road that runs on top of the flowline. From there, it curves around the southwest and northwest sides of the basin, and then continues northeast up a fairly steep slope toward the pressure chamber. The road splits before reaching the pressure chamber, with a branch veering north towards the Ryan Dam Road.

The road presumably was constructed at the same time that employees at Rainbow completed the swimming pool, reportedly around 1925.[2] The stone culvert as well as a small plank bridge (HAER No. MT-95-M) on the road with little doubt are original components, erected to handle the seasonal flow of two natural gullies that drain into the basin. The stone culvert is at the southernmost of those two gullies which intersects the road just as it begins to curve the basin's west corner. In addition to the stone culvert, the plank bridge survives at present (May 2009) and the road remains intact and in use. The swimming pool was recorded to HAER standards (HAER No. MT-95-E) just prior to its removal in the mid-1990s.[3]

The stone culvert is comprised of a main culvert and a secondary culvert. The main culvert carries the gully under the road. It has two pipelines in common headwalls at the inlet and outlet. Both headwalls are made of sandstone blocks laid up with cement mortar. The headwall at the culvert's inlet (southwest wall) measures 17' long by 3' wide at the top, and has a maximum height of 5'. It curves slightly into the road. The two pipes at the inlet are stacked one directly above the other, with the highest one about 2'6" below the top of the headwall. Each is an 18" pipe made of corrugated galvanized metal. They diverge away from each other as they pass under the road.

The stone headwall at the main culvert's outlet (northeast wall) measures 22' long at the top and has a maximum height of slightly less than 5'. The wall's southernmost 17' are straight and

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[1] Montana Power Company, *Insurance Map of Rainbow Montana*, April 1921, revised to 16 December 1964, drawing on file, PP-L Montana, Billings.

[2] William O'Keefe, telephone interviews with Fredric L. Quivik, 20 November 1987, 17 February 1988. At the time of these interviews O'Keefe was the assistant superintendent of operations at the Rainbow Hydroelectric Facility, while Quivik worked as an historian for Renewable Technologies, Inc.

[3] Lon Johnson and Mary McCormick, *Historic American Engineering Record, Rainbow Hydroelectric Facility, Swimming Pool, HAER No. MT-95-E* (Butte: Renewable Technologies, Inc., 1995).

No.	Name / Function	Construction	Status
3	Flowline & Pressure Chamber	1909-10	Contributing
7	Powerhouse	1909-10; 1917	Contributing
20	Powder Magazine	ca. 1909	Contributing
21	Clubhouse	1925	Removed
22	Residence	1911	Removed
23	Residence	1913	Removed
24	Garage	1933	Removed
30	Swimming Pool	ca. 1925	Removed
35	Railroad Grade	1908	Contributing
36	Terraced Gardens	ca. 1920s / 1930s	Contributing
39	Stone Culvert	ca. 1925	Contributing
40	Plank Bridge	ca. 1925	Contributing

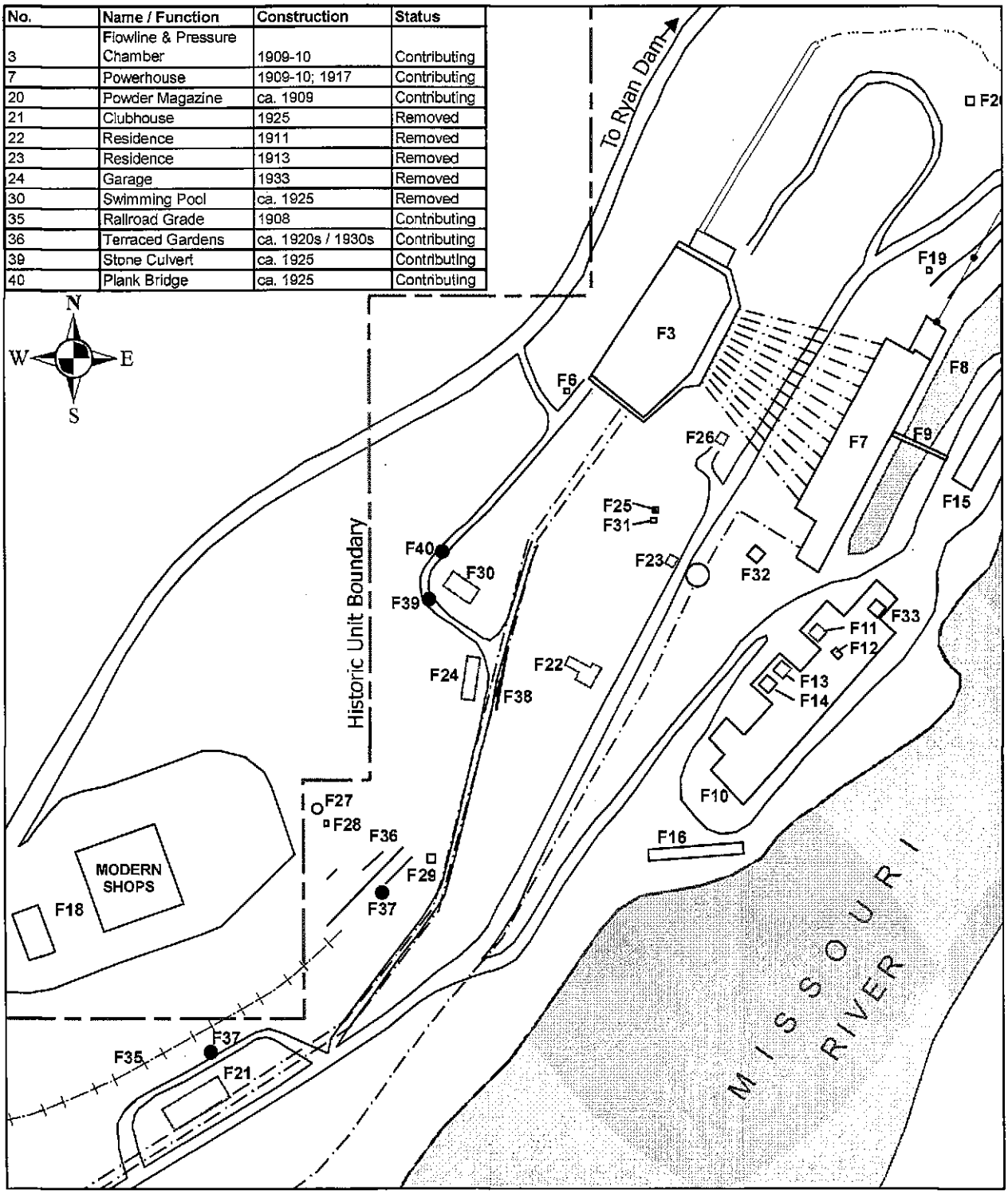

Figure 1. Map of Rainbow Hydroelectric Facility

capped by a 3'6" wide course of stone, which is about 6" wider than the bulk of the wall. The northernmost 5' of wall curves slightly into the road, and lacks a cap. The outlet ends of both pipes are in the headwall's straight portion. There they are about 6' apart from each other. The lower pipe is at the southern or lower end of the headwall; it lies about 4'2" below the top of the headwall and is now almost completely filled with silt. The upper pipe or northernmost pipe lies about 3' below the top of the headwall; it remains completely open.

The inlet to the secondary culvert is at the main culvert's outlet. It has a curved sandstone masonry headwall, the two ends of which connect to the main culvert headwall essentially creating a basin. The headwall lies about 2' below the road, measures about 17' long total at the top and stands about 2'6" tall. The straight line distance from end to end is 10'6," and the basin is 4'6" wide at its widest. Water discharged from the main culvert into the basin currently passes into a 24" corrugated metal pipe in the southern end of the secondary culvert headwall. Installed sometime before 1976, this pipe replaced the culvert's original intake, an 18" metal pipe toward the north end of the headwall.[4] A steel plate cap was placed over the original pipe at the time. It is still visible in the headwall.

The secondary culvert's original and replacement pipes are both buried conduits (Figure 2).[5] From the inlet headwall, they both run down (southeast) the basin toward the fill section of flowline. While the original pipe closely followed along the southwest edge of the swimming pool, the replacement was several feet to south. It appears that both pipes eventually feed into a 3' buried pipe on the pool's southeast side. From there, the 3' pipe continued southeast, passing under the flowline and beyond.

III. FUTURE OF PROPERTY

PPL-Montana plans to remove the stone culvert at Rainbow. In order to address this impact, the company has sponsored recording the structure to HAER standards.

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[4] Montana Power Company, *Rainbow Plant Residence Grounds Underground Utility Lines*, 12 April 1976, Drawing no. 15355-C-2, on file, at PPL-Montana, Billings.

[5] Ibid.